THE PRESENT STATUS OF MYCOLOGY IN MEDICAL SCIENCE

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Out of the befuddled maze of mycology in the last century came bacteriology. Even Pasteur's first studies were made on the yeasts, but the great master soon penetrated this jungle of minute plants to reach the haunts of smaller but more deadly enemies of man, the bacteria, and over the path of this great explorer has since trudged that great army whose distinguished Generals have brought to bay so many of the strictly parasitic diseases of man. But out of the jungle came the bacteria, and the Medical Sciences are now for the first time in many years thoughtfully contemplating the tangled brush through which Pasteur and his contemporaries first painfully cut their way. For Bacteria are classed by mycologists as a group (Schizomycetaceæ) of the Fungaceæ. Not that the jungle had not its explorers, for one only has to remember that the connection of Oidium albicans with thrush by Langenbeck in 1839 and by Robin in 1843 is one of the oldest pillars in the temple in which microbiologists worship. Nor should we forget that Schönlein in the same year found the fungus cause of favus, a work completed by Gruby in 1844; nor that the gigantic figure of Sabouroud first opened the eyes of the dermatologists to the necessity for placing many of their clinical diseases on a more scientific basis. But from the eighties of the past century up to recently, mycology almost faded out of the picture. The jungle remained a maze. Its explorers rarely tread the highway cut through it. They were content to describe what they saw in their own way and had little contact with, and, naturally small corroboration from each other. The result is a mass of names, inadequate description and, only too often, unproven relation to man's diseases. No better demonstration of the chaos in which mycology finds itself is the only real standard work on the whole subject, Saccardo's "Sylloge Fungorum", a work written in Latin and costing $1,500—generally more—when it can be obtained. In this huge mass of dreary description perhaps lie tucked away here and there etiologic factors in many a disease whose pathogenesis is today only partially explained or totally unknown. This is particularly applicable to dermatology and to tropical medicine. Aldo Castellani avers that over 20 per cent of

tropical diseases are due to fungi, *sensu stricto*. And to reflect that not a tithe of the jungle's secrets are yet known, with 140,000 or more species of fungi so far described. Only a small percentage of these are of medical interest; only a portion of them are microbic, but even then their numbers are overawing, for we must at least know something of general mycology and much of harmless hyphales to be medical mycologists.

There is another side to the question: Explorers are not apt to be very closely in contact with the busy life of the crowd. They rather glory in avoiding the intricate life of communities. Therefore the technique of modern laboratory research, the marvellous clinical insight into the nature of a disease, and the acid test of modern pathology are rarely worked into the picture sufficiently to satisfy the average medical man. We are not particularly excited to know that a new species of Aspergillus was found in the external auditory canal of an inflamed ear of one man, or of even three or four men, unless it is evident from standard methods of proof that the organism had definitely caused the disease. Any one who reads a text-book effort to connect all fungi supposed to be pathogenic with the disease they are supposed to produce will find a large number of species in which only one observation was made. Many type cultures have been lost or are unattainable. Many have never been cultivated, and many have not been even studied in experimental animals.

The result of all this is seen in the present controversy over an adequate, a scientific classification, which is the dominant note today in medical mycology. At this very moment a sharp discussion is going on between Sabouraud and Langeron over the propriety of reclassing the dermatophytes on a botanical, not clinical basis. Langeron proposes no less than to suppress the generic names, Achorion, Microsporum and Endodermophyton and rearrange all species of the six principal genera on a botanical basis. Far in the rear of the discussion is Vuillemin whose mission, a holy one, this for many years has been. Sabouraud is perfectly willing to accept the change if there can be a definite morphologic and cultural standard established, a premise which he frankly doubts on account of polymorphism in varying media. All of these men are real leaders in medical mycology. If such divergence of opinion exists among them how can we modest delvers expect to emerge. On the other hand, fungi are being rapidly found week by week, which are at least etiologic factors in disease, and men who are thus persuaded are clamoring for less technicism, more simplicity and more exactness in classification, nomenclature and description. While not at all averse to a certain

degree of Celtic individuality, the writer feels the urgent need for at least a little order.

The jungle is humming with life and filling up with investigators and perhaps, shall we say it—with adventurers. Out of this busy hum will come great things for the Science of Medicine. Soon order will be established and soon a reanimated mycology will jostle every one of its neighbors into new paths of progress.

Already we have sniffed a strong suspicion that the not utterly ignorant opponents of Pasteur had something in their favor when they held out stiffly for the importance of the terrain in infections processes. So far, we can justly say that many pathogenic fungi, while they may not cause a given disease, do seem to convert a disordered physiologic condition into a disease. In contradistinction to bacteria, fungi generally lack aggressiveness, their poisons are subtle, their progress in the body slow. But in our drive for an application of scientific proof to supposedly pathogenic fungi, let us not lose sight of the fact that as yet many well-known and generally accepted mycotic causes of disease have failed to show the immunologic phenomena now being demanded by bacteriology. Nor is bacteriologic technique always sufficient for mycology; nor are the relative values of macroscopic appearance of cultures and morphology equal in the two sciences. Nor is bacteriology so plagued by pleo— and polymorphism. Nor is animal experimentation so final and decisive in mycology.

The signs of the times are indicated by the movement of great bodies. International Congresses in Tropical Medicine are giving more and more time to mycologic papers, Schools of Tropical Medicine are beginning to create Departments of Mycology with equal rank to those of bacteriology.

What we need now is hard work, cooperation, simplicity in classification and, *above all*, standardization of technique.